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(54) **Spiral oven with reversible air flow and method for controlling the air flow**

(57) A spiral oven and method for its use includes the step of using a forward/reversing fan to produce a first airflow and a second inverted airflow in the cooking chamber. The proportion of time each airflow occurs may be unbalanced within an oven residence time or cook cycle, and either airflow may begin the cycle. In addition, the fan velocity may vary so that the speed of the first airflow is different from the speed of the second airflow.

A braking resistor allows the fan to quickly changeover between full-forward and full-reverse directions, while a programmable delay limits adjustments to the heat output control method until temperature variations caused by alternating between the first direction of rotation and the second direction of rotation have stabilized. Because of the reversing airflow pattern, the product cooks more evenly across the cook belt.

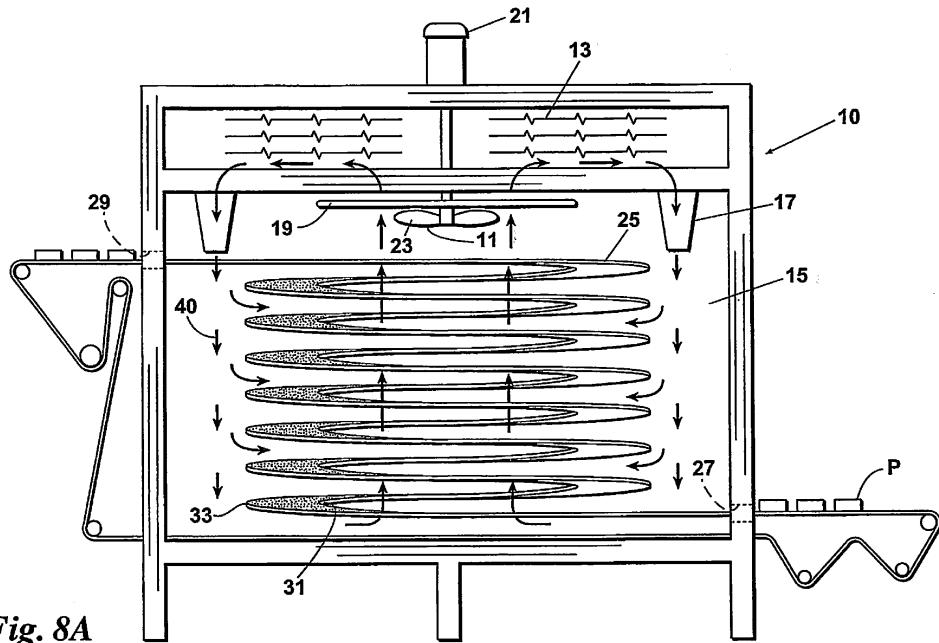


Fig. 8A



EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
10 X	WO 2012/122491 A1 (UNITHERM FOOD SYSTEMS INC [US]; HOWARD DAVID [US]) 13 September 2012 (2012-09-13) * the whole document *	4-9	INV. A21B1/48 A21B1/24
15 Y	----- WO 2006/101531 A1 (MIDDLEBY CORP [US]; WIKER JOHN H [US]; ALBERT MAGDY A [US]; PANICKER M) 28 September 2006 (2006-09-28) * paragraph [0070]; figures *	1-3	1-3
20 A	----- WO 2012/166962 A2 (JOHN BEAN TECHNOLOGIES CORP [US]; MCVEAGH CHARLES [US]; PASCHOALINI FR) 6 December 2012 (2012-12-06) * the whole document *	1-9	
25 A	----- EP 0 528 593 A1 (HEAT CONTROL INC [US]) 24 February 1993 (1993-02-24) * the whole document *	1-9	
30 A	----- US 4 118 181 A (ONODERA HIROSUKE) 3 October 1978 (1978-10-03) * the whole document *	1,4,7	TECHNICAL FIELDS SEARCHED (IPC)
35 A	----- WO 2005/023006 A2 (APV SYSTEMS LTD [GB]; ST CLAIR-THOMPSON STEPHEN JOHN [GB]; SHAW JAMES) 17 March 2005 (2005-03-17) * the whole document *	1,4,7	F25D
40			
45			
50 1	The present search report has been drawn up for all claims		
55	Place of search The Hague	Date of completion of the search 25 September 2017	Examiner Vigilante, Marco
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
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ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 13 19 5615

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

25-09-2017

10	Patent document cited in search report	Publication date	Patent family member(s)		Publication date
15	WO 2012122491	A1 13-09-2012	AU 2012225317	A1 19-09-2013	
			EP 2672829	A1 18-12-2013	
			US 2012318254	A1 20-12-2012	
			WO 2012122491	A1 13-09-2012	
20	WO 2006101531	A1 28-09-2006	EP 1875141	A1 09-01-2008	
			WO 2006101531	A1 28-09-2006	
25	WO 2012166962	A2 06-12-2012	BR 112013030039	A2 09-08-2016	
			EP 2713756	A2 09-04-2014	
			US 2013133637	A1 30-05-2013	
			US 2017016624	A1 19-01-2017	
30			WO 2012166962	A2 06-12-2012	
	EP 0528593	A1 24-02-1993	AT 131688	T 15-01-1996	
			AU 655294	B2 15-12-1994	
			CA 2073291	A1 16-02-1993	
			DE 69206922	D1 01-02-1996	
			DE 69206922	T2 23-05-1996	
			DK 0528593	T3 04-03-1996	
			EP 0528593	A1 24-02-1993	
			ES 2081058	T3 16-02-1996	
			FI 923473	A 16-02-1993	
			GR 3018495	T3 31-03-1996	
			JP H05192250	A 03-08-1993	
			NZ 243434	A 22-12-1994	
35			TW 197938	B 11-01-1993	
			US 5322007	A 21-06-1994	
			US 5407692	A 18-04-1995	
	US 4118181	A 03-10-1978	NONE		
40	WO 2005023006	A2 17-03-2005	NONE		
45					

EPO FORM P0459
For more details about this annex : see Official Journal of the European Patent Office, No. 12/82